Sea Surface Temperature (SST)

Product Description

This Level 2 and 3 product provides sea surface temperature at 1-km resolution over the global oceans. In addition, a quality assessment parameter is included for each pixel. The Level 2 product is produced daily and consists of global day and night coverage every 24 hours. It is used to generate the gridded Level 3 products daily and weekly for day and night conditions. A quality parameter is provided for each dataset.

Research & Applications

The global distribution and variability of sea-surface temperature are key inputs to Earth energy and hydrological balance studies and long-term climate change studies. In addition, sea-surface temperature is required by a number of MODIS algorithms including generation of perceptible water, lifted index, water-leaving radiance, productivity, oceanic aerosol properties, and temperature and water vapor profiles. MODIS sea-surface temperature retrievals will be incorporated into a match-up database with radiance and buoy sea-surface temperature observations (see MOD 32).

Data Set Evolution

Sea-surface temperature determination is based on MODIS calibrated mid- and far-IR radiances, (Bands 20, 22, 23, 31 and 32 from MOD 02) using an algorithm which exploits the differences in atmospheric transmissivity in the different IR bands to enable highly accurate estimation of the atmospheric effects which enables accurate SST generation. The cloud screening product (MOD 04) is an ancillary input to the algorithm along with a land mask which is used to mark non-water pixels while an ice-extent mask limits polar sea coverage. A sequence of spatial and temporal homogeneity tests are applied to validate the quality of the cloud-free observations. The AIRS SST estimate (Parameter 2523) will be used as a near-real time quality assessment of skin temperature. Visible and near-IR radiances (Bands 3, 4, 5, 6) will be used as a secondary cloud flag in the event that the cloud screening product is not available.

Suggested Reading

Abbott, M.R. and D.B. Chelton, 1991.

Barton, I.J., *et al.,* 1989.

Brown, O.B. and R.E. Chaney, 1983.

Edwards, T., *et al.,* 1990.

Llewellyn-Jones, D.T., *et al.*, 1984.

McClain, E.P., *et al.*, 1985.

Minnett, P.J., 1991.

Minnett, P.J., 1995.

Schluessel, P., *et al.,* 1990.

Smith, A.H., *et al.,* 1994.

Smith, W.L., *et al.,* 1996.

Strong, A.E. and E.P. McClain, 1984.

MOD 28

PRODUCT SUMMARY

Coverage:

global ocean surface, clear-sky only

Spatial/Temporal Characteristics:

1 km/daily, weekly/day and night

Key Science Applications:

energy and hydrological balance, climate change models

Key Geophysical Parameters:

sea-surface temperature (MODIS parameter 2527) and quality assessment (MODIS parameter 5359)

Processing Level:

2, 3

Product Type:

standard, at-launch

Science Team Contact:

O. Brown

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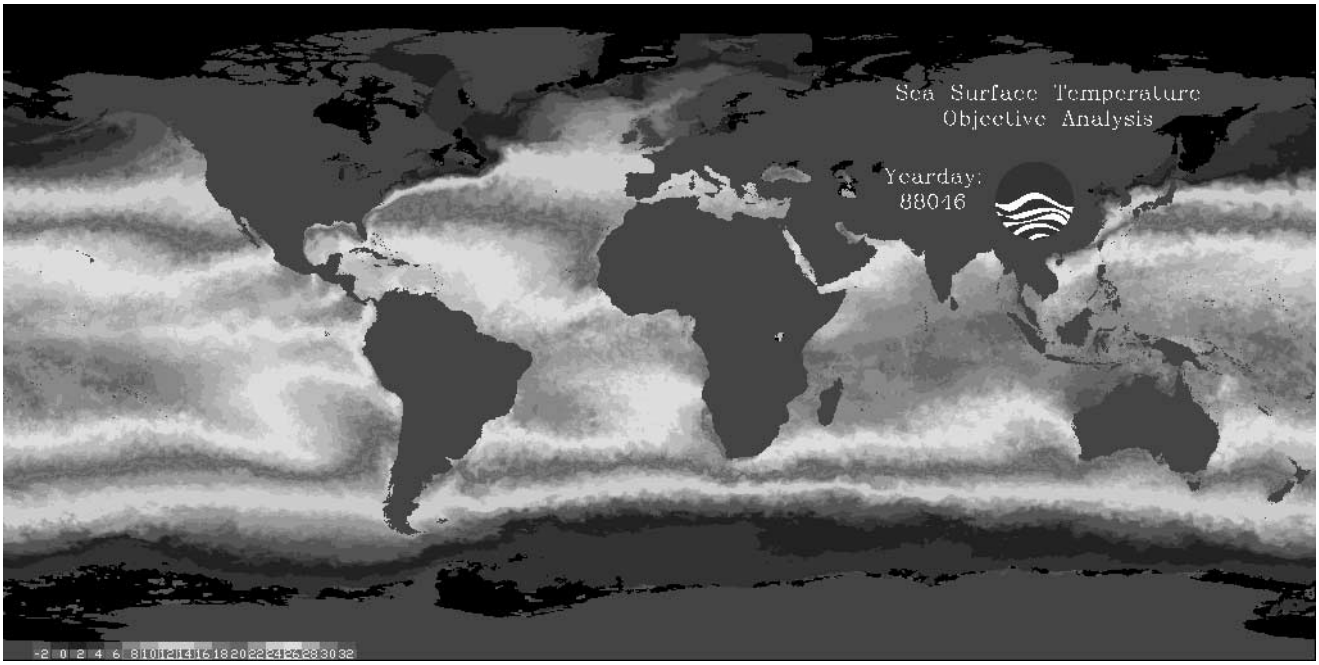

Figure 31. **Global Infrared Sea Surface Temperature.** This daily pre-MODIS Sea Surface Temperature (SST) image for February 15, 1988, was produced using objective analysis techniques applied to NOAA AVHRR data. MODIS is expected to reduce the uncertainties in IR SST by a factor of 2 because of improvements in sensor calibration and algorithms. *O. Brown, R. Evans, RSMAS*

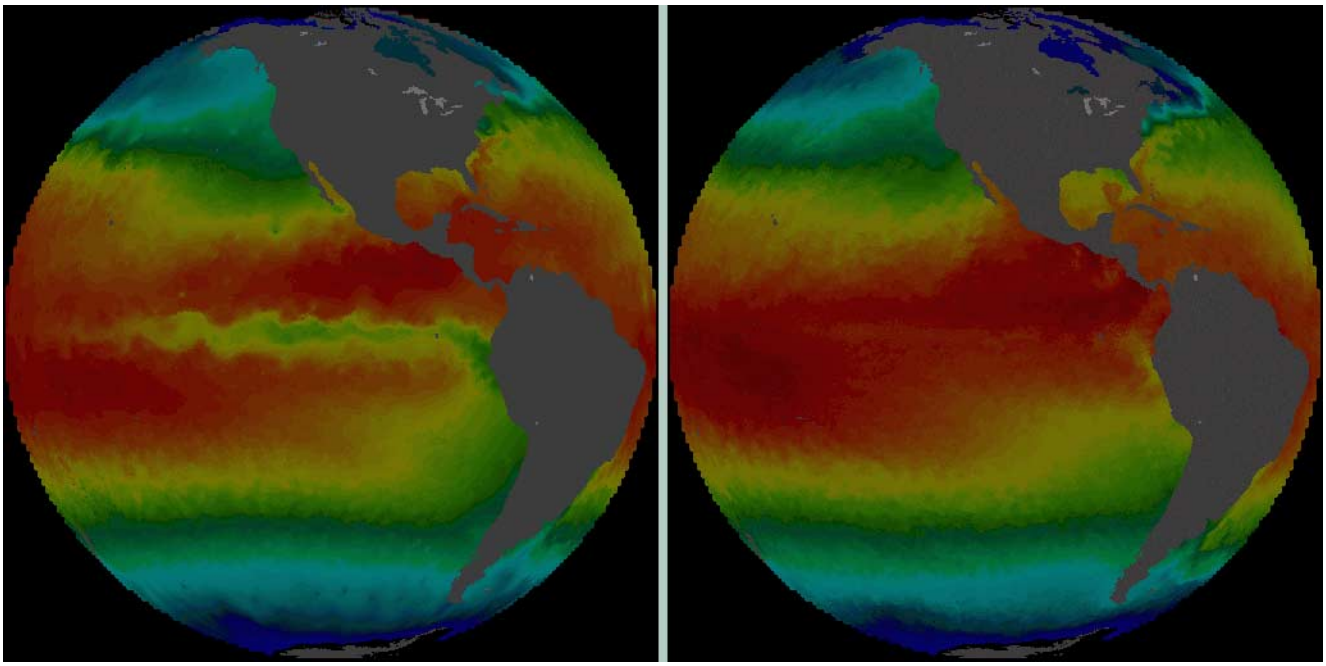

Figure 32. **Changes in Pacific SST Due to El Niño.** Sea Surface Temperature (SST) from the NOAA AVHRR, showing patterns before (left) and during (right) the major 1992 El Niño. The improved accuracy of IR SST products expected from MODIS will enable scientists to investigate the relatively small changes in SST hypothesized to be responsible for triggering El Niño cycles in the Pacific and their ramifications globally. (Note: temperatures range from 20-30°C.) *O. Brown and G. Feldman, "Reports to the Nation: El Niño and Climate Prediction," Spring 1994, No. 3, University Corporation for Atmospheric Research., Boulder, CO.*